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(54) **Tamper evident closure assembly**

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Description

[0001] The present invention refers to a plug to be screwed onto a screw neck of a container.

[0002] In the field of dispensing of drinks and other liquid products contained in containers, such as drinks with vitamin supplements or water with additives in general, plugs are foreseen that comprise a protective cap that can be closed with respect to a base collar.

[0003] These plugs are generally arranged on a container in which there is a need to have both an open and closed position and in which the closed position must occur a certain number of times. Moreover, it must be possible to check extremely quickly and simply whether the container is unopened or whether it has already been opened.

[0004] Therefore, first of all there is the need to foresee a protective cap of the extremely simple "open and close" type and also that stays in closed position with a certain degree of security.

[0005] Known examples of such plugs to be screwed onto a screw neck of a container of the type with an open and closable protective cap have already been made, but have a very complex construction and a certain number of constituent parts. The presence of more than two parts consequently involves assembly costs and the need to have many moulds with a further increase in costs.

[0006] It must also be indicated that plugs to be screwed onto a screw neck of a container of the type with an open and closable protective cap currently exist that have simply just the possibility of checking that the entire plug is arranged without tampering on the neck of the container. On the other hand, there is a requirement to be able to make a plug equipped with a cap that foresees the possibility of checking both that such tampering has not occurred and that the protective cap has not been opened from the base collar to which such a cap is fixedly attached and articulated.

[0007] US Patent Application Publication No. 2003/0062369 A1 discloses a snap-hinge closure with tamper-evident lid according to the preamble of claim 1.

[0008] The purpose of the present invention is therefore that of identifying a different solution to the technical problems quoted above.

[0009] Another purpose of the invention is that of making a plug to be screwed onto a screw neck of a container of the type with an open and closable protective cap that is able to highlight both types of tampering indicated above.

[0010] A further purpose of the invention is that of making a plug that is easy to make and not very expensive, as well as particularly simple, to use and operate.

[0011] These purposes according to the present invention are accomplished by making a plug to be screwed onto a screw neck of a container of the type with an open and closable protective cap, as outlined in the attached claim 1.

[0012] Further relevant characteristics and details of the present invention are the object of the dependent claims.

[0013] The characteristics and advantages of a plug to be screwed onto a screw neck of a container of the type with an open and closable protective cap according to the present invention shall become clearer from the following description, given as an example and not for limiting purposes, of an embodiment with reference to the attached figures, in which:

Figure 1 is a top section of a plug of the type with an open and closable protective cap according to the present invention applied to a container.

Figures 2 and 3 are different perspective views of the plug of figure 1.

Figure 4 is a plan view from above of the plug of figure 1.

Figure 5 is a top side view, partially in section, of a second embodiment of the plug according to the invention.

Figure 6 is a perspective view of the plug of figure 5.

[0014] With reference generically to the various figures, a plug to be screwed onto a screw neck of a container of the type with an open and closable protective cap is shown in a totally schematic way, wholly indicated with 11.

[0015] The plug 11, to be screwed onto a screw neck 12 of an opening of a container (not shown), comprises a reclosable protective cap 13 having a smaller diameter with respect to a base collar 14.

[0016] The base collar 14 is made with a section in steps and in a first step portion 14a, with a greater diameter, it is arranged on the screw neck 12 of the container. The protective cap 13 and the base collar 14 are connected together through a hinge element consisting of a strip 16. As shown in the figures, such a strip 16 also foresees a pair of weakening lines 17 that promote the folding of the protective cap 13 with respect to the base collar 14 in the opening step. Indeed, the presence of such weakening lines 17 allows the cap to be held open at 180° with respect to the attachment area promoting the dispensing of the liquid into the mouth of the user.

Moreover, the protective cap 13 and the base collar 14 are connected together through a series of freely breakable elements, such as tabs 18.

[0017] It must then be noted that the plug 11 comprises a pouring element 19 inside it that is snap-inserted in the base collar 14. In particular, it foresees a lower inner end that is arranged in abutment in a perimetric cavity 20 of a first step portion 14a of the base collar 14. In particular, said lower inner end comprises a pair of concentric sealing lips 21, 22. The most outer 21 of these lips is arranged in the quoted perimetric cavity 20 of the base collar 14 at the first step portion 14a and the most inner 22 of these lips is arranged in an inner mouth 23 of the container and, for example, is olive-shaped to carry out an im-

proved seal.

[0018] The pouring element 19 also foresees, at an outer end, a pouring opening 24 that goes into sealing engagement with a concentric double lip 25, 26 that projects inwards from the protective cap 13. It should be noted that the first annular lip with a smaller diameter 25 is longer than the second annular lip with a greater diameter 26 and also the first lip 25 is sealably arranged inside the pouring element 19 and the second lip 26 being sealably arranged outside the pouring element 19.

[0019] Moreover, in an intermediate portion the pouring element 19 through a circumferential projection thereof facing outwards 27 makes a circumferential seal with a circumferential inner extension 28 of the protective cap 13 that extends below a second step portion 14b arranged at the top of the base collar 14.

[0020] According to the invention, moreover, it must be noted that the protective cap 13 and the base collar 14 are moulded in a single piece in closed position, whereas the pouring element 19 is a separate piece from them.

[0021] It must also be noted that between the first step portion 14a and the second step portion 14b of the base collar 14 at least one further breakable element is foreseen, in the example defined by three fillform elements 29. These fillform elements 29 are connected on one side to the protective cap 13 and on the other side to the first step portion 14a and they stretch and break in elongated position when the protective cap 13 is first opened from the base collar 14.

[0022] Moreover, the base collar 14 in a lower free end thereof below an internally threaded portion 30 foresees a ring-shaped portion 31 that is separable since it is connected by a series of freely breakable elements, such as tabs 32.

[0023] It should be noted that a series of openings 10 can be foreseen, for example between the protective cap and the base collar, indicated with a dotted and dashed line in figure 3, which ease the removal of washing liquids avoiding the stagnation thereof inside. Moreover, such a liquid can come out from the small openings present between the tabs 18, from the openings present at the sides of the strip 16 and finally at the sides and between the breakable elements 29, 29'.

[0024] Figures 5 and 6 show a second embodiment of the plug according to the invention in which the same elements are indicated with the same reference numerals.

[0025] In this second embodiment a thrusting area 33 is foreseen in the upper portion of the protective cap 13 and the at least one further breakable element is defined by a small strip 29' that stretches and elongates like for the previous case.

[0026] The operation of such a plug according to the invention is extremely simple and easy.

[0027] Upon the removal of the protective cap 13, and the rotation thereof about the strip 16 that acts as a hinge, the tabs 18 break. Moreover, the further breakable ele-

ment defined either by one or more fillform elements 29 or by a small strip 29' extend to breaking point.

[0028] The presence of the pair of weakening lines 17 promotes the folding of the protective cap 13 with respect to the base collar 14 in the opening step keeping it in open position.

[0029] Once used, the protective cap 13 can easily be repositioned above the pouring element 19 to close the pouring opening 24 with its lips 25 and 26 sitting on it.

[0030] Moreover, the circumferential inner extension 28 of the protective cap 13 that extends below a second step portion 14b arranged at the top of the base collar 14 goes into abutment and in a seal with the circumferential projection facing towards the outside 27 of the pouring element 19 with circumferential seal.

[0031] Advantageously, a plug according to the present invention foresees the presence of an element that shows a user the first opening of the protective cap in a clear and unmistakable manner.

[0032] It has thus been seen that a plug according to the present invention accomplished the purposes outlined previously.

[0033] The plug is particularly simple in structure and does not require complicated arrangements of parts, being made in just two parts, the outer one of which is in a single piece.

[0034] The plug of the invention thus conceived is susceptible to numerous modifications and variants, which are all covered by the same invention.

[0035] Moreover, in practice, the materials used, as well as their sizes and the components, can be whatever according to the technical requirements.

35 Claims

1. Plug (11) to be screwed onto a screw neck (12) of a container, the plug (11) comprising a protective cap (13) having a smaller diameter with respect to a base collar (14) in steps, said protective cap (13) and said base collar (14) being connected through a hinge element (16) and a series of freely breakable elements (18), said plug (11) comprising inside it a pouring element (19) that, at an open outer end for pouring goes into sealing engagement with a concentric double lip (25, 26) that projects towards the inside from said protective cap (13), characterised in that said pouring element (19), at a lower inner end thereof, is arranged in abutment with a first step portion (14a) of said base collar and, in an intermediate portion thereof, makes a circumferential seal with a circumferential inner extension (28) of said protective cap that extends below a second step portion (14b) arranged at the top of said base collar, in that said protective cap (13) and said base collar (14) are moulded, in closed position, in a single piece that is separated by said pouring element (19) and in that between said first step portion (14a) and said second

step portion (14b) of said base collar (14) at least one further breakable element (29, 29') is foreseen, connected on one side to said protective cap (13) and on the other side to said first step portion (14a) and that stretches and breaks in elongated position the first time said protective cap (13) is opened from said base collar (14).

2. Plug according to claim 1, **characterised in that** said base collar in a lower free end thereof below an internally threaded portion foresees a ring-shaped portion (31) that is separable since it is connected by a series of freely breakable elements (32).

3. Plug according to claim 1, **characterised in that** said pouring element (19), at said lower inner end where it is arranged in abutment with said first step portion of said base collar, has a pair of concentric sealing lips (21, 22) that are arranged the most outer in a perimetric cavity (24) of said base collar at said first step portion and the most inner in an inner mouth of said container.

4. Plug according to claim 1, **characterised in that** said pouring element (19) foresees a circumferential projection (27) facing outwards to make said circumferential seal with the circumferential inner extension (28) of said protective cap that extends below the second step portion arranged at the top of said base collar.

5. Plug according to claim 1, **characterised in that** said at least one further breakable element connected to said protective cap and to said first step portion is at least one filiform element (29).

6. Plug according to claim 1, **characterised in that** said at least one further breakable element connected to said protective cap and to said first step portion is defined by a small strip (29') that stretches and extends when stressed.

7. Plug according to claim 1, **characterised in that** said concentric double lip that projects inwards from said protective cap comprises a first annular lip (25) with a smaller diameter that is longer than a second annular lip (26) with a larger diameter, said first lip being sealably arranged inside said pouring element and said second lip being sealably arranged outside said pouring element.

8. Plug according to claim 1, **characterised in that** said protective cap foresees a thrusting area (33) in its upper portion.

Patentansprüche

1. Verschlusselement (11), welches auf einen Schraubenhals (12) eines Behälters zu Schrauben ist, wobei das Verschlusselement (11) eine Schutzkappe (13) mit einem kleineren Durchmesser bezüglich eines Basisbundes (14) in Stufen aufweist, wobei die Schutzkappe (13) und der Basisbund (14) durch ein Scharnierelement (16) und einer Reihe von frei abzubrechenden Elementen (18) verbunden ist, wobei das Verschlusselement (11) innen ein Ausgusselement (19) aufweist, welches an einem offenen äußeren Ende zum Ausgießen in dichtenden Eingriff mit einer konzentrischen doppelten Lippe (25, 26) kommt, die zur Innenseite von der Schutzkappe (13) vorsteht, **dadurch gekennzeichnet, dass** das Ausgusselement (19) an seinem inneren Ende anliegend an einen ersten Stufenteil (14a) des Basisbundes angeordnet ist, und an seinem Zwischenstück eine umlaufende Abdichtung mit einer umlaufenden inneren Verlängerung (28) der Schutzkappe herstellt, die sich unter einem zweiten Stufenteil (14b) erstreckt, der am Oberteil des Basisbundes angeordnet ist, wobei die Schutzkappe (13) und der Basisbund (14) in einer geschlossenen Position zu einem einzigen Stück gegossen sind, welches durch das Ausgusselement (19) getrennt ist, und wobei zwischen dem ersten Stufenteil (14a) und dem zweiten Stufenteil (14b) des Basisbundes (14) zumindest ein weiteres durchzubrechendes Element (29, 29') vorgesehen ist, welches an einer Seite mit der Schutzkappe (13) und an der anderen Seite mit dem ersten Stufenteil (14a) verbunden ist, und welches in der ausgestreckten bzw. gespannten Position gestreckt wird und bricht, wenn die Schutzkappe (13) das erste Mal weg vom Basisbund (14) geöffnet wird.
2. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** der Basisbund in einem unteren freien Ende davon unter einem mit Innengewinde versehenen Teil einen ringförmigen Teil (31) vorsteht, der trennbar ist, da er durch eine Reihe von frei durchzubrechenden Elementen (32) verbunden ist.
3. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** das Ausgusselement (19) ein Paar von konzentrischen Dichtungslippen (21, 22) an dem erwähnten unteren inneren Ende hat, wo es anliegend an den ersten Stufenteil des Basisbundes angeordnet ist, welche an der äußeren Seite in einem umlaufenden Hohlraum 24 des Basisbundes am erwähnten ersten Stufenteil angeordnet sind und am inneren Umfang in einer inneren Mündung des Behälters.
4. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** das Ausgusselement (19) ei-

nen umlaufenden Vorsprung (27) vorsieht, der nach außen weist, um eine umlaufende Dichtung mit der umlaufenden inneren Verlängerung 28 der Schutzkappe herzustellen, der sich unter den zweiten Stufenteil erstreckt, der am Oberteil des Basisbundes angeordnet ist.

5. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** das mindestens eine weitere durchzubrechende Element, welches mit der Schutzkappe und dem ersten Stufenteil verbunden ist, zumindest ein dünnes Element (29) ist.

6. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** das mindestens eine weitere durchzubrechende Element, welches mit der Schutzkappe und mit dem ersten Stufenteil verbunden ist, durch einen kleinen Streifen (29) definiert ist, der sich streckt und ausdehnt, wenn er unter Spannung gesetzt wird.

7. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** die konzentrische doppelte Lippe, die nach innen von der Schutzkappe vorsteht, eine erste ringförmige Lippe (25) mit einem kleineren Durchmesser aufweist, der länger als eine zweite ringförmige Lippe (26) mit einem größeren Durchmesser ist, wobei die erste Lippe dichtend in dem Ausgussselement angeordnet ist, und wobei die zweite Lippe dichtend außerhalb des Ausgussselementes angeordnet ist.

8. Verschlusselement nach Anspruch 1, **dadurch gekennzeichnet, dass** die Schutzkappe einen Druckbereich (33) in seinem oberen Teil vorsieht.

Revendications

1. Bouchon (11) à visser sur un col à vis (12) d'un conteneur, le bouchon (11) comprenant un capuchon protecteur (13) possédant un diamètre inférieur par rapport à un collet de base (14) en palier, ledit capuchon protecteur (13) et ledit collet de base (14) étant reliés par l'intermédiaire d'un élément de charnière (15) et d'une série d'éléments qui peuvent se briser librement (18), ledit bouchon (11) comprenant à l'intérieur de ce dernier un élément verseur (19) qui, au niveau d'une extrémité externe ouverte pour verser entre en contact étanche avec une double lèvre concentrique (25, 26) qui fait saillie vers l'intérieur depuis ledit capuchon protecteur (13), **caractérisé en ce que** ledit élément verseur (19), au niveau d'une extrémité interne inférieure de ce dernier, est agencé en butée avec une première partie en palier (14a) dudit collet de base et dans une partie intermédiaire de ce dernier, forme un dispositif d'étanchéité circumférentiel avec une extension in-

terne circumférentielle (28) dudit capuchon protecteur qui s'étend sous une seconde partie en palier (14b) agencée au sommet dudit collet de base, **en ce que** ledit capuchon protecteur (13) et ledit collet de base (14) sont moulés, en position fermée, en une pièce unique qui est séparée par ledit élément verseur (19) et en ce qu'entre ladite première partie en palier (14a) et ladite seconde partie en palier (14b) dudit collet de base (14) se situe au moins un élément qui peut se briser supplémentaire (29, 29'), relié sur un côté audit capuchon protecteur (13) et sur l'autre côté à ladite première partie en palier (14a) et qui s'étire et se rompt en position étirée la première fois que ledit capuchon protecteur (13) est ouvert depuis ledit collet de base (14).

2. Bouchon selon la revendication 1, **caractérisé en ce que** ledit collet de base au niveau d'une extrémité libre inférieure de ce dernier sous une partie filetée interne comporte une partie en forme d'anneau (31) qui peut être séparée puisqu'elle est reliée par une série d'éléments qui peuvent se briser librement (32).

3. Bouchon selon la revendication 1, **caractérisé en ce que** ledit élément verseur (19), au niveau de ladite extrémité interne inférieure où il est agencé en butée avec ladite première partie en palier dudit collet de base, possède une paire de lèvres d'étanchéité concentriques (21, 22) qui sont agencées le plus à l'extérieur dans une cavité périmétrique (24) dudit collet de base au niveau de ladite première partie en palier et le plus à l'intérieur dans une bouche interne dudit conteneur.

4. Bouchon selon la revendication 1, **caractérisé en ce que** ledit élément verseur (19) comporte une projection circumférentielle (27) dirigée vers l'extérieur afin de former ledit dispositif d'étanchéité circumférentiel avec l'extension interne circumférentielle (28) dudit capuchon protecteur qui s'étend sous la seconde partie en palier agencée au sommet dudit collet de base.

5. Bouchon selon la revendication 1, **caractérisé en ce que** ledit au moins un élément qui peut se briser supplémentaire relié audit capuchon protecteur et à ladite première partie en palier est au moins un élément filiforme (29).

6. Bouchon selon la revendication 1, **caractérisé en ce que** ledit au moins un élément qui peut se briser supplémentaire relié audit capuchon protecteur et à ladite première partie en palier est défini par une petite bande (29') qui s'étire et s'étend quand elle est soumise à des contraintes.

7. Bouchon selon la revendication 1, **caractérisé en**

ce que ladite double lèvre concentrique qui fait saillie vers l'intérieur depuis ledit capuchon protecteur comprend une première lèvre annulaire (25) présentant un diamètre inférieur qui est plus long qu'une seconde lèvre annulaire (26) présentant un diamètre supérieur, ladite première lèvre étant agencée de manière étanche à l'intérieur dudit élément verseur et ladite seconde lèvre étant agencée de manière étanche à l'extérieur dudit élément verseur.

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8. Bouchon selon la revendication 1, caractérisé en ce que ledit capuchon protecteur comporte une zone de poussée (33) dans sa partie supérieure.

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Fig.1

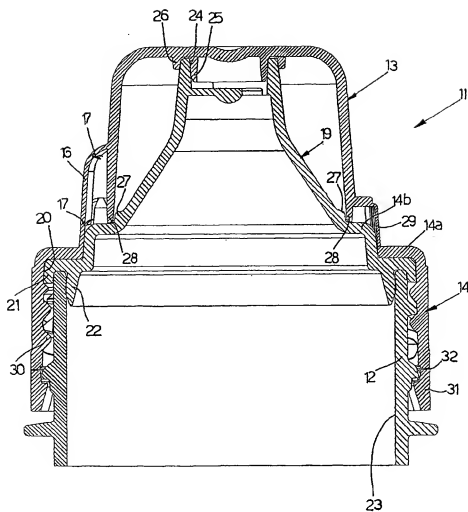
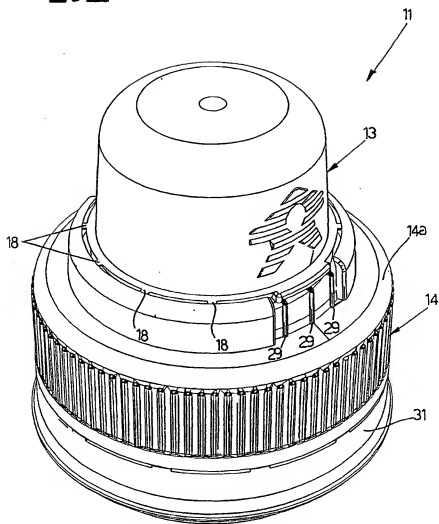


Fig. 2



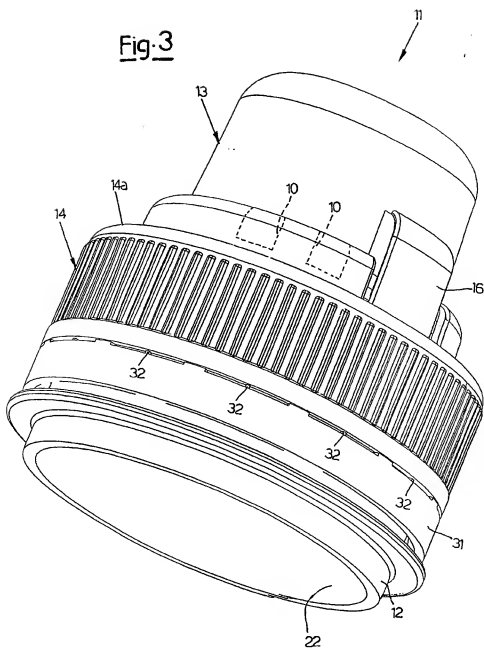


Fig. 5

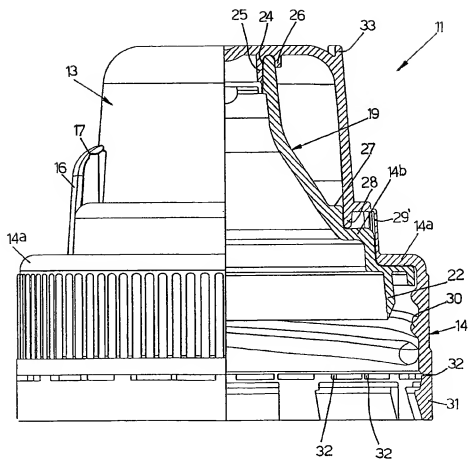
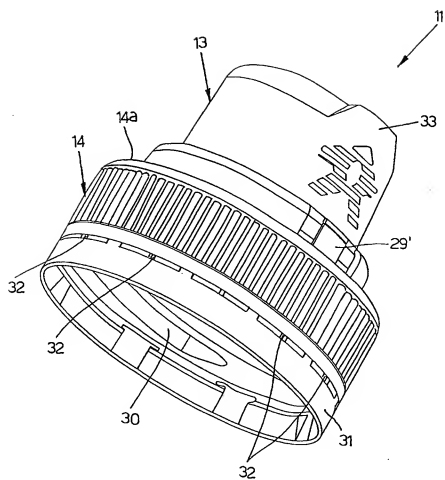


Fig. 6



REFERENCES CITED IN THE DESCRIPTION

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